

Lancaster County Transportation Strategy

Jeff McKerrow, PE, PTOE

Nick Weander, PTP, MPA

June 12, 2018



Purpose of Study

- Roadmap for how transportation infrastructure will develop in Lancaster County
- Assist Lancaster County with best management strategies
- Why is it important?
 - Informs decisions about where to direct limited resources
 - Furthers county goals and objectives
 - Provides access to future economic activity
 - Addresses immediate needs for infrastructure, with transparency
 - Increases coordination of agencies for maximum use of funding



Agenda

- Team Introductions
- Study Goals
- Study Progress Update
- Peer Review Overview
- Best Practices
- Recommendations
- Next Steps



Study Goals

- Develop Goals –
 - Realistic
 - Measurable goals to monitor
 - Consistent with LRTP Regional Goals
 - Support overall vision for County and Region



Study Goals

Goal 1. Maintenance – Well-maintained roads, bridges and County infrastructure.

Objective - Maintain roads, bridges and County infrastructure to a state of good repair to maximize the value of Lancaster County transportation assets

Goal 2. Mobility and System Reliability – An efficient, reliable, and well-connected transportation system to move people and freight.

Objective - Optimize the reliability of the transportation network

Objective - Provide a reliable network of farm-to-market and home-to-work roadways

Goal 3. Livability and Travel Choice – A multimodal system that provides travel options to support livable communities.

Objective - Consider paved shoulders on paved county roadways

Goal 4. Safety and Resiliency – Provide a safe and resilient transportation network.

Objective - Institute a Roadway Safety Audit Report (RASR) program

Objective - Evaluate the resiliency of the system to natural and human-events



Study Goals

Goal 5. Economic Vitality – A transportation system that supports economic vitality for residents and businesses.

Objective - Improve farm-to-market and home-to-work networks to support county commerce

Objective - Improve county economic competitiveness by enhancing the transportation system to promote business growth

Goal 6. Environmental Sustainability – A transportation system that enhances the natural, cultural and built environment.

Objective - Maintain compliance with air quality standards

Objective - Reduce fossil fuel consumption

Objective - Avoid, minimize and mitigate environmental impacts of transportation projects

Goal 7. Funding and Cost Effectiveness – Collaboration in funding transportation projects to maximize resources

Objective - Make the best use of public resources

Objective - Decrease the gap between available resources and needed improvements



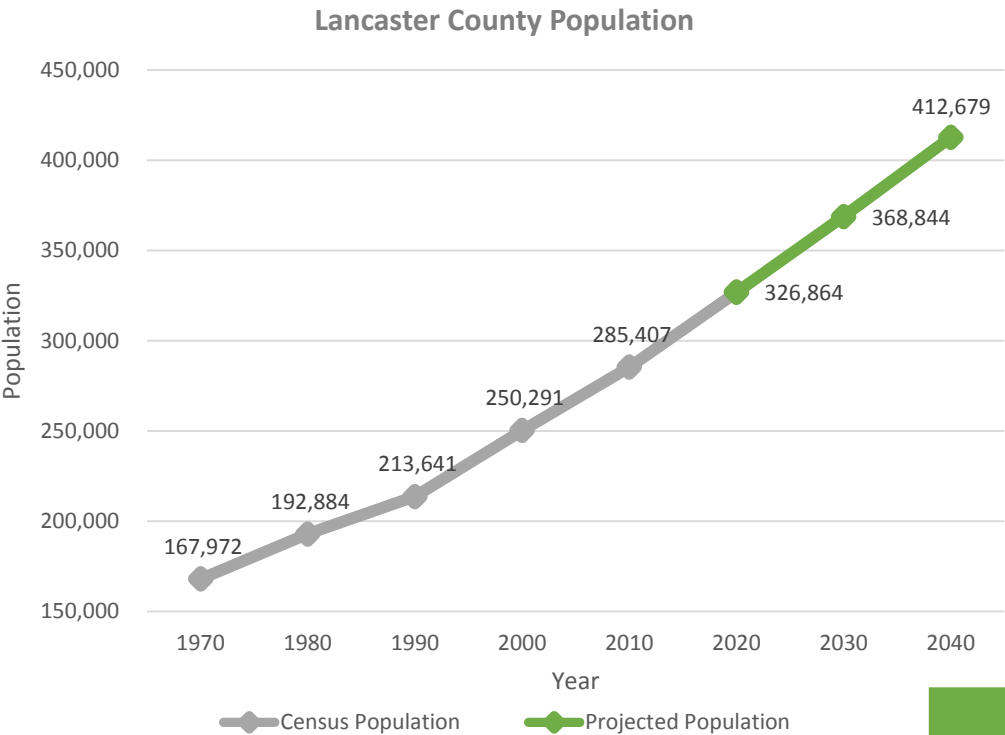
Study Progress Update



Lancaster County - Today



Community Profile – Lancaster County



Annual Change in Population Since 2010

Lancaster County	2010	2011	2012	2013	2014	2015	2016	Avg. Annual Growth Rate
Population	286,195	289,945	293,606	297,489	302,097	305,705	309,607	
Change	-	1.31%	1.26%	1.32%	1.55%	1.19%	1.29%	1.32%

Source: <https://lincoln.ne.gov/city/plan/reports/cpanrev/benchrpt/bench17.pdf>

Community Profile – Lancaster County

Population Trends

Municipality	Historical Change			
	2000	2010	2016	Percent Change
Lincoln	225,581	258,379	273,018	17%
Bennet	570	719	889	36%
Davey	153	154	143	7%
Denton	189	190	229	17%
Firth	564	590	467	21%
Hallam	276	213	246	12%
Hickman	1,084	1,657	1,891	43%
Malcolm	413	382	408	1%
Panama	253	256	262	3%
Raymond	186	167	123	51%
Roca	220	220	195	13%
Sprague	146	142	131	11%
Waverly	2,448	3,277	3,686	34%
Total Population	232,083	266,346	281,688	18%

Ratio of City to County Population



Source: <https://lincoln.ne.gov/city/plan/reports/cpanrev/benchrpt/bench17.pdf>

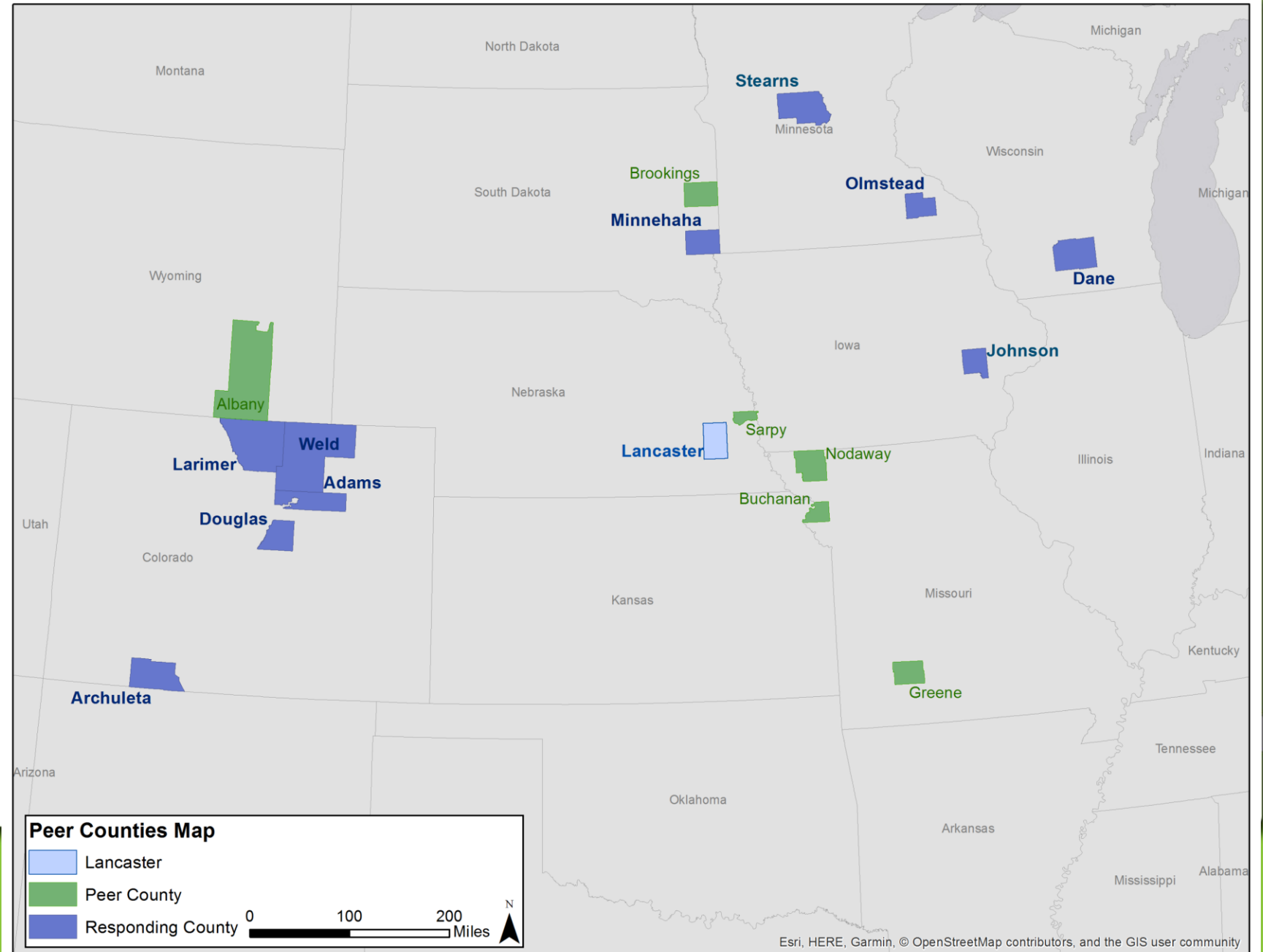
Peer County Review

- Goal

- Determine what other areas are using to manage system preservation, optimization, and growth
- Review similar size communities with similar development & travel patterns

		County Population	Major Community Population	Major Community Portion of Population	Area (sq mi)	Major University
	Lancaster Co, NE (Lincoln)	285,407	258,379	91%	846	UNL
1	Adams Co, CO (Thornton/ Denver Metro)	503,167	136,703	27%	1,184	n/a
2	Weld Co, CO (Greeley)	304,633	92,889	30%	4,017	UNC
3	Minnehaha Co, SD (Sioux Falls)	187,318	183,200	98%	814	USF
4	Olmsted Co, MN (Rochester)	153,102	114,011	74%	655	n/a
5	Larimer Co, CO (Fort Collins)	343,976	164,207	48%	2,634	Col State
6	Sarpy Co, NE (Papillion/Omaha)	175,692	19,597	11%	248	n/a
7	Dane Co, WI (Madison)	536,416	252,551	47%	1,238	Wisconsin
8	Johnson Co, IA (Iowa City)	130,882	74,398	57%	623	Iowa
9	Nodaway Co, MO (Maryville)	22,810	11,972	52%	878	NWMS
10	Buchanan Co, MO (St. Joseph)	89,100	76,780	86%	415	MO West
11	Albany Co, WY (Laramie)	38,256	32,382	85%	4,309	Wyoming
12	Brookings, Co, SD (Brookings)	34,135	23,895	70%	805	SDS
13	Greene Co, MO (Springfield)	288,072	167,319	58%	678	MO State
14	Douglas Co, CO (Castle Rock/Denver Metro)	335,299	48,231	14%	843	n/a
15	Archuleta Co, CO (Pagosa Sprgs)	12,854	1,838	14%	1,356	n/a
16	Stearns Co, MN (Saint Cloud)	154,708	67,641	44%	1,343	St Cloud St
	Average	206,901	91,726	51%	1,378	

Peer County Review



Peer County Review

- **Department Staff Size**

- Adams County and Green County – most similar to Lancaster County with 100 employees

- **Relationships with Communities within County Lines**

- Close relationships with larger communities to share costs
- Two counties provide bridge inspections for smaller communities, but do not perform work

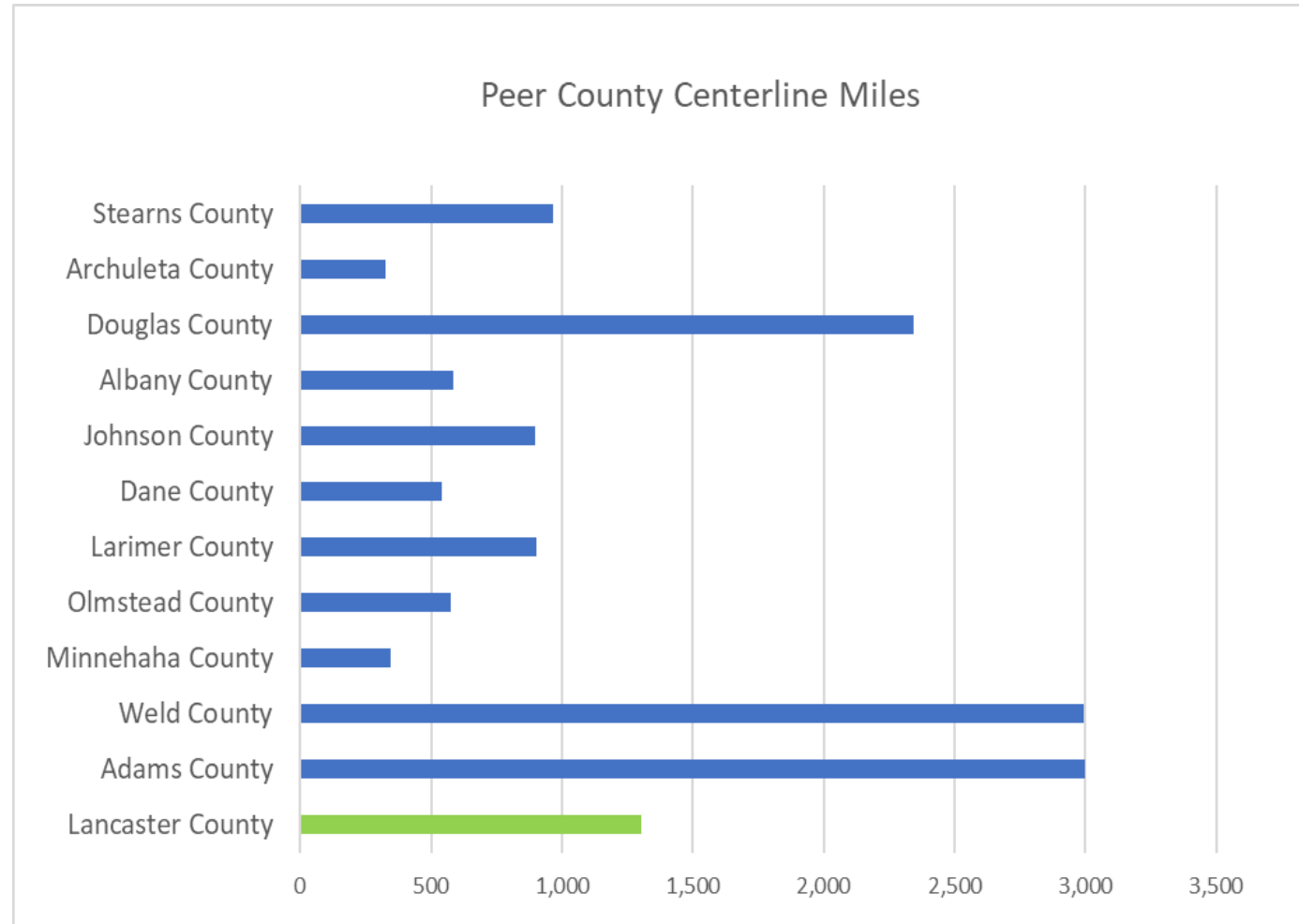


Peer County Review

- **Centerline Miles**

- Peer Average = 1,226

- Lancaster County = 1,304



Peer County Review

- **Bridges**

- Peer Average – Total Number of Bridges = 211
- Lancaster County = 184
- Percent of Functionally Obsolete
 - Peer = 4%
 - Lancaster County = 3%
- Percent of Structurally Deficient
 - Peer = 8%
 - Lancaster County = 15%



Peer County Review

- **Quality Assurance Programs**

- Peers = variety of methods for quality assurance.
 - Counties using management systems suggest efficiencies with the programs, particularly
 - Consistent data
 - Data readily available for analysis
 - Useful for budget preparation and recommendations
 - Other counties use spreadsheets and GIS for data management and mapping.



Peer County Review

- **Pavement Performance System**

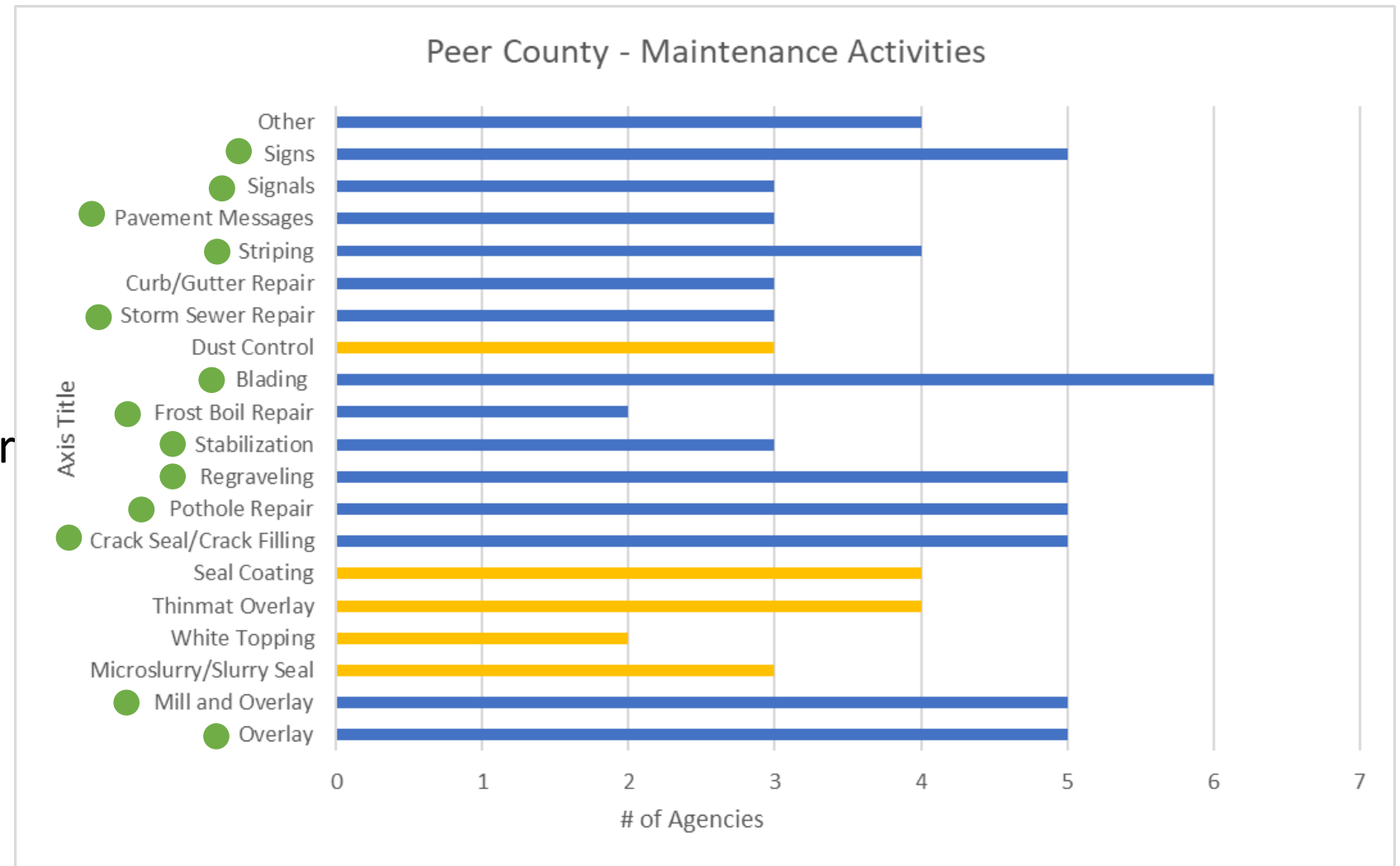
- Peers = 5 of 7 peer responses have pavement management system in place, with measures:
 - LOS
 - Volume/Capacity
 - ASTM standards
 - PCI
 - ADT
 - Functional Class
- Lancaster County - uses 10-point scale developed by MNDOT and Pavement Condition Index (PCI)



Peer County Review

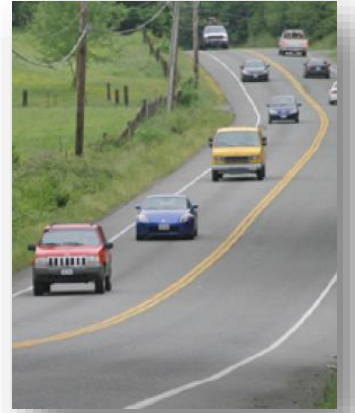
● = Lancaster County Maintenance Activities

- very similar to peer activity



Peer County Review

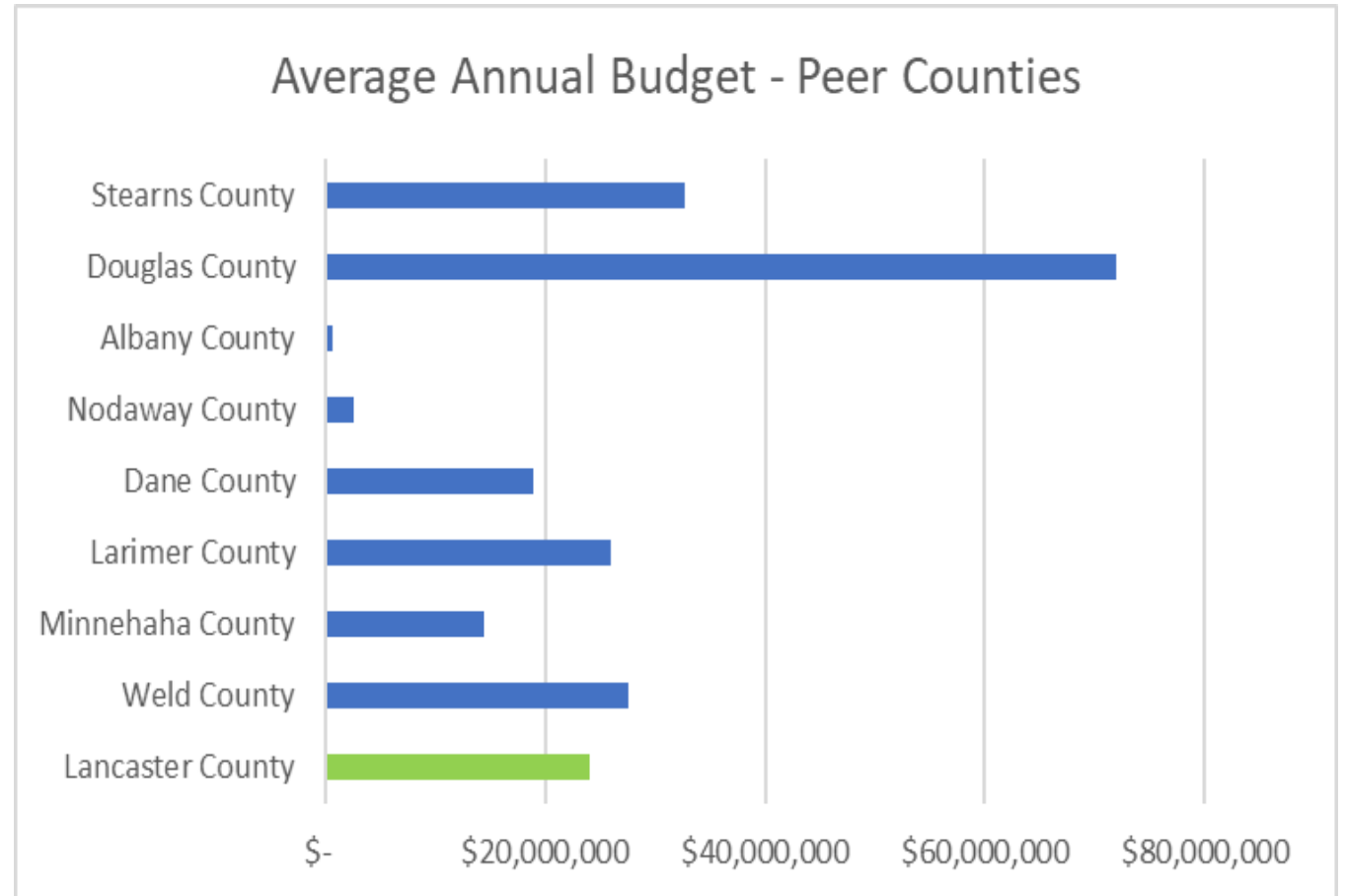
- **Prioritization of Maintenance and Capital Improvements**
 - Majority use performance measures to assist with priorities
 - Use recommendations from Pavement Management System
 - Lancaster County – Reviews existing data collected and discusses priorities with County Commissioners



Peer County Review

- **Budget**

- Peer Average = \$24,300,000
- Lancaster County = \$24,000,000



Peer County Budget Review

		County Population	Major Community Population	% of Rural Pop	Rural Pop	Centerline Miles	Budget	Budget/ Centerline Miles
	Lancaster Co, NE (Lincoln)	285,407	258,379	9%	27,028	1304	\$ 24,000,000	\$ 18,405
3	Minnehaha Co, SD (Sioux Falls)	187,318	183,200	2%	4,118	347	\$ 14,400,000	\$ 41,499
5	Larimer Co, CO (Fort Collins)	343,976	164,207	52%	179,769	905	\$ 26,000,000	\$ 28,729
7	Dane Co, WI (Madison)	536,416	252,551	53%	283,865	541	\$ 18,800,000	\$ 34,750
11	Albany Co, WY (Laramie)	38,256	32,382	15%	5,874	587	\$ 600,000	\$ 1,022
14	Douglas Co, CO (Castle Rock/Denver Metro)	335,299	48,231	86%	287,068	2344	\$ 72,000,000	\$ 30,717
16	Stearns Co, MN (Saint Cloud)	154,708	67,641	56%	87,067	966	\$ 32,599,000	\$ 33,746
	Average	265,996	124,702	53%	141,294	948	\$ 27,399,833	\$ 28,893
	Lancaster %	107%	207%	18%	19%	138%	88%	64%
	Median	285,407	164,207	52%	87,067	905	\$ 24,000,000	\$ 30,717
	Lancaster %	100%	157%	18%	31%	144%	100%	60%
	w/o Albany County, Wyoming							
	Average	307,187	162,368	43%	144,819	1,068	\$ 31,299,833	\$ 31,308
	Lancaster %	93%	159%	22%	19%	122%	77%	59%
	Median	310,353	173,704	53%	133,418	936	\$ 25,000,000	\$ 32,232
	Lancaster %	92%	149%	18%	20%	139%	96%	57%

Peer County Budget Review

- Lancaster has significantly smaller rural population
 - 9% compared to often 50%+
- Lancaster has more centerline miles to maintain
 - 20% to 44% more
- Lancaster's budget / centerline miles is significantly less
 - \$18k / mile compared with \$28 - \$32k / mile
 - 57% - 64% of average/median



Peer County Property Tax Receipts as Percentage of Total Funding

County	Property Tax %
Lancaster County, Nebraska	55%
Weld County, Colorado	64%
Minnehaha County, South Dakota	56%
Larimer County, Colorado	26%
Dane County, Wisconsin	62%
Albany County, Wyoming	59%
Douglas County, Colorado	37%
Stearns County, Minnesota	58%



Average of Peer Counties (excluding Lancaster) = 51%

Peer County Revenue Sources

- Property Tax
- Motor Vehicle Fees
- Highway Buy-back
- Bridge By-back
- State DOT
- Maintenance Fees
- License Plate Fees
- Sales Tax
- Wheel Tax
- Federal Funding
- Gravel Tax
- County Bonding

- ***Approximately 83% of the county property tax comes from properties within cities / villages***
- ***Approximately 80% comes from the City of Lincoln***
- ***17% of property tax from rural areas with 9% of population***

Best Practices Discussion



Best Practices – Gravel Roads

- **Consider Implementing Dust Control**

- Extends life of gravel roads
- Annual Treatment
- Provides dust control and stability

- **Test Alternatives in 1000' sections**

- Chlorides
- Resins
- Clays
- Soybean Oils
- Other Commercial Projects



• *Based upon peer review range of practices, literature review, local policies, project experiences*

Best Practices – Gravel Roads

- ***Gravel Roads Construction & Maintenance Guide***, USDOT / FHWA (August 2015)

- Joint effort with FHWA and South Dakota Local Technical Assistance Program
- Routine Maintenance & Rehabilitation
- Drainage
- Surface Gravel
- Dust Control / Stabilization
- Innovations

- **When to pave a gravel road?**

- Do we:
 - Pave?
 - Reconstruct?

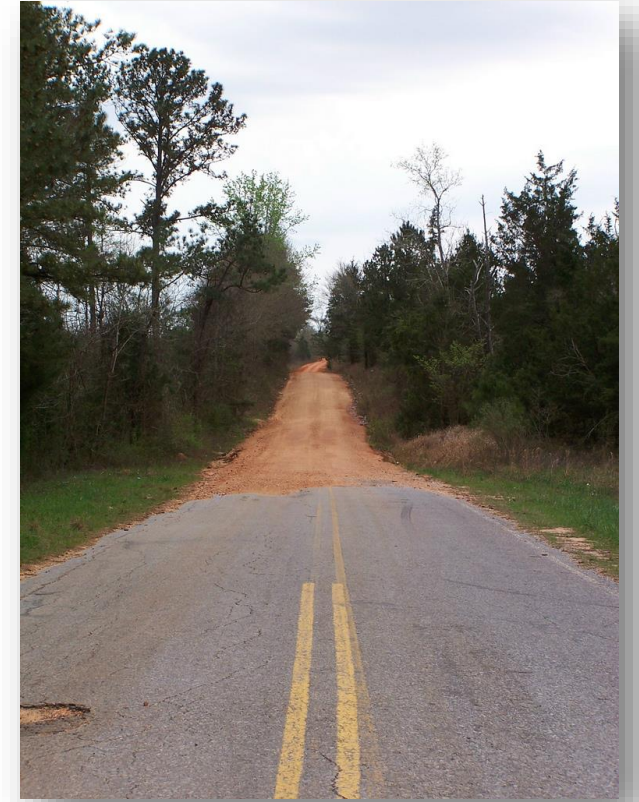
U.S. Customary						
Total roadway width (ft) by functional subclass						
Design speed (mph)	Major access	Minor access	Recreational and scenic	Industrial/commercial access	Resource Recovery	Agricultural access
15	-	18.0	18.0	20.0	20.0	22.0
20	-	18.0	18.0	20.0	20.0	24.0
25	18.0	18.0	18.0	21.0	21.0	24.0
30	18.0	18.0	18.0	22.5	22.5	24.0
35	18.0	18.0	18.0	22.5	22.5	24.0
40	18.0	18.0	20.0	22.5	-	24.0
45	20.0	20.0	20.0	23.0	-	26.0
50	20.0	20.0	20.0	24.5	-	-
55	22.0	-	20.0	-	-	-
60	22.0	-	-	-	-	-

Note: Total roadway width includes the width of both traveled way and shoulders.

- *Based upon peer review range of practices, literature review, local policies, project experiences*

When to Pave a Gravel Road?

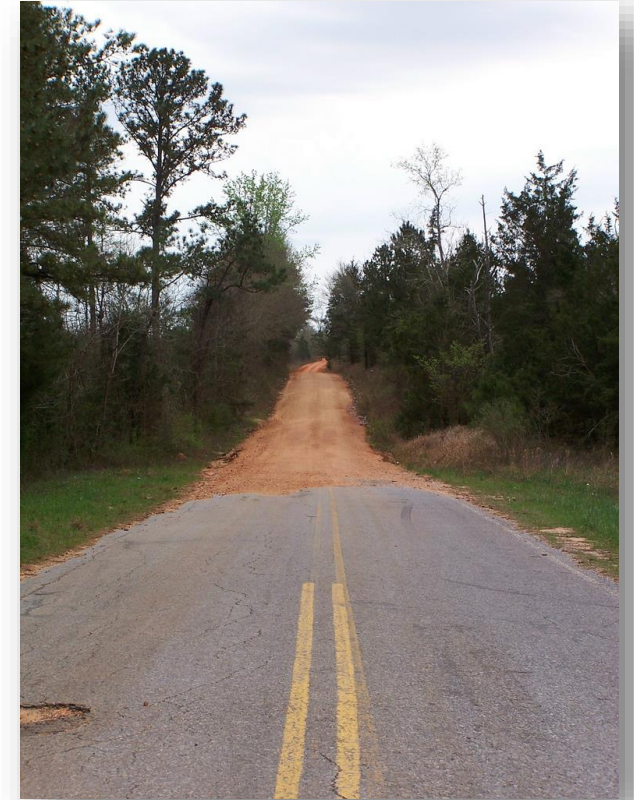
- Paving is not always the answer
 - Increases speeds
 - More expensive to construct and often maintain
 - Requires higher skill level for maintenance
 - More expensive to repair if damaged by heavy loads
- 10-part answer to consider



- *Based upon peer review range of practices, literature review, local policies, project experiences*

When to Pave a Gravel Road?

1. Road Management Plan
2. Local Agency Commitment
3. Traffic Needs
4. Standards Adopted
5. Safety Needs
6. Good Base and Drainage
7. Cost Estimates for Construction
8. Life Cycle Costs
9. User Costs
10. Public Opinion



- *Based upon peer review range of practices, literature review, local policies, project experiences*

Answer 1 – After Developing a Road Management Program

- Inventory the roads
- Assess road conditions
 - Maintain annual records
- Select a road management plan
- Determine overall needs
- Establish priorities
 - Keep good roads good



- *Based upon peer review range of practices, literature review, local policies, project experiences*

Answer 2 – When the Local Agency is Committed to Effective Management

Answer 3 – When Traffic Demands It

- Passenger cars
- Trucks
- Farm Equipment



Answer 4 – When Standards have been Adopted

- Keep it simple
- Design, Construction, and Maintenance

- *Based upon peer review range of practices, literature review, local policies, project experiences*

Answer 5 – After Considering Safety

- Sight Distance
- Alignments and Curves
- Lane Width
 - 22' width minimum recommended with 2' shoulders
- Design Speed
- Surface Friction
- Superelevation



• *Based upon peer review range of practices, literature review, local policies, project experiences*

Answer 6 – After the Base and Drainage are Improved

Answer 7 – After Determining Costs and Road Preparation

- Total Road Costs
- Maintenance Costs



Answer 8 – After Comparing Pavement Costs, Pavement Life, and Maintenance Costs

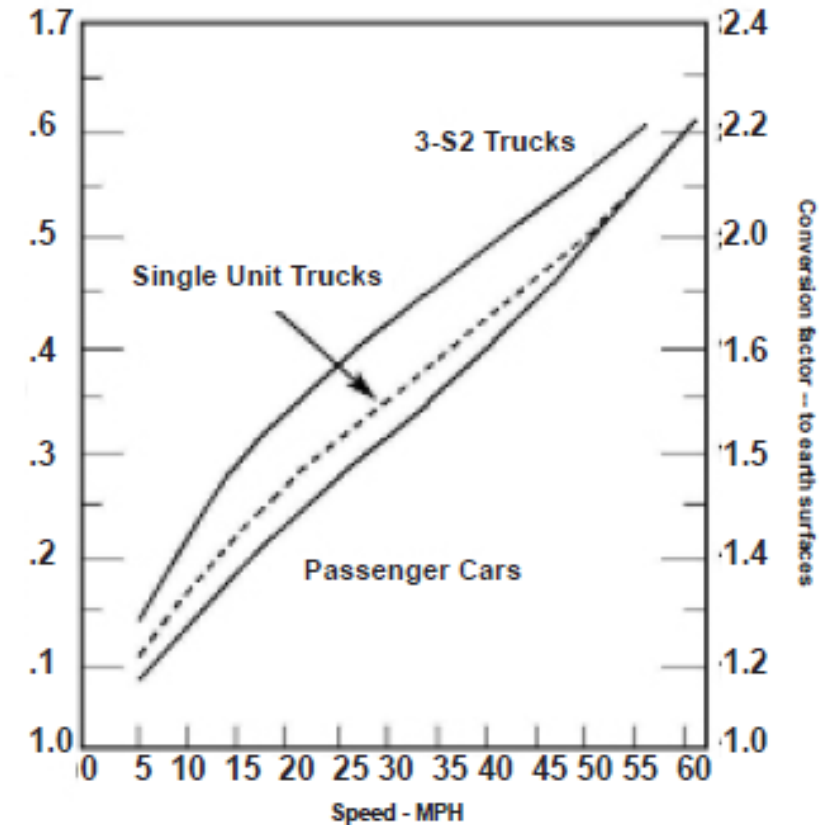
- All roads (paved and gravel) require:
 - Maintain shoulders
 - Keep ditches clean
 - Clean culverts regularly
 - Maintain roadsides (brush, grass, etc.)
 - Replace signs and sign posts
- Paved roads require patching, resealing, and striping
- Gravel roads require regravelling, stabilization and dust control



• *Based upon peer review range of practices, literature review, local policies, project experiences*

Answer 9 – After Comparing User Costs

- Costs to operate vehicles **increases** on gravel and dirt roads
 - Increased fuel consumption
 - Additional wear and tear on tires, alignments, etc.
 - Dust causes extra engine wear, oil consumption, and maintenance costs
- Example – at 40 mph, costs increase:
 - 40% for passenger cars
 - 45% for single-unit trucks



- *Based upon peer review range of practices, literature review, local policies, project experiences*

Answer 10 – After Weighing Public Opinion

- Fact-based decisions are important
 - Questions 1 - 9
- Public opinion and input crucial; should also not be ignored
- Includes educating public

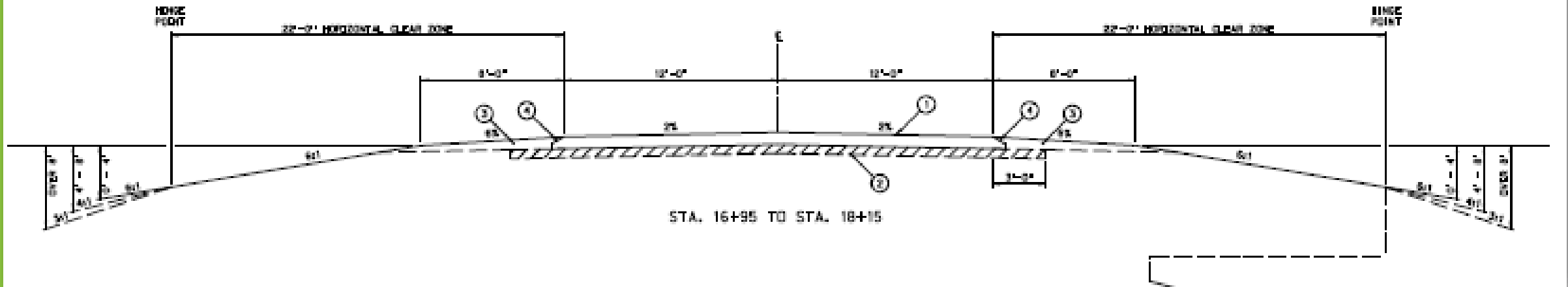


Note – Paving, in this instance, refers to adding a solid surface (2” – 4” of asphalt) to existing road bed.

- *Based upon peer review range of practices, literature review, local policies, project experiences*

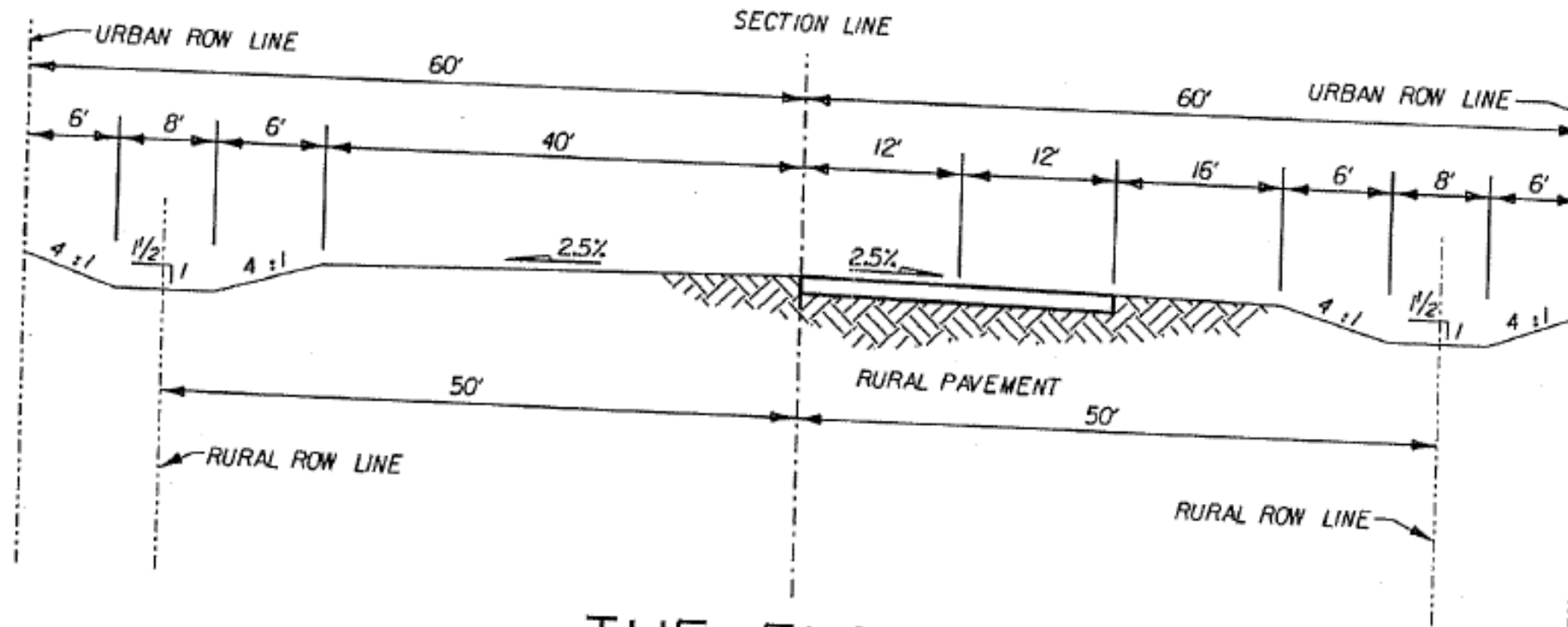
Are We Paving or Reconstructing?

TYPICAL CROSS SECTIONS



- *Based upon peer review range of practices, literature review, local policies, project experiences*

Are We Paving or Reconstructing?



THE FUTURE
PHASE I - 24' (MIN.) RURAL PAVING
IN THE COUNTRY

- Based upon peer review range of practices, literature review, local policies, project experiences

Best Practices - Pavement

- Pavement Management –
 - Implement pavement management system – Pavement preservation, Rehabilitation, Reconstruction
 - Conduct regular assessments
 - Maintain pavement database
 - Analysis component – health of road, annual budget, prioritizing, impact of funding decisions
 - Remaining Service Life – Forecast future maintenance needs

• Ex:

Treatment Type	Average Service Life Extension (Years)
Slurry seal	7
Chip seal	10
Thin asphalt overlay	12

- Budget-based Scenarios or PCI-based Scenarios

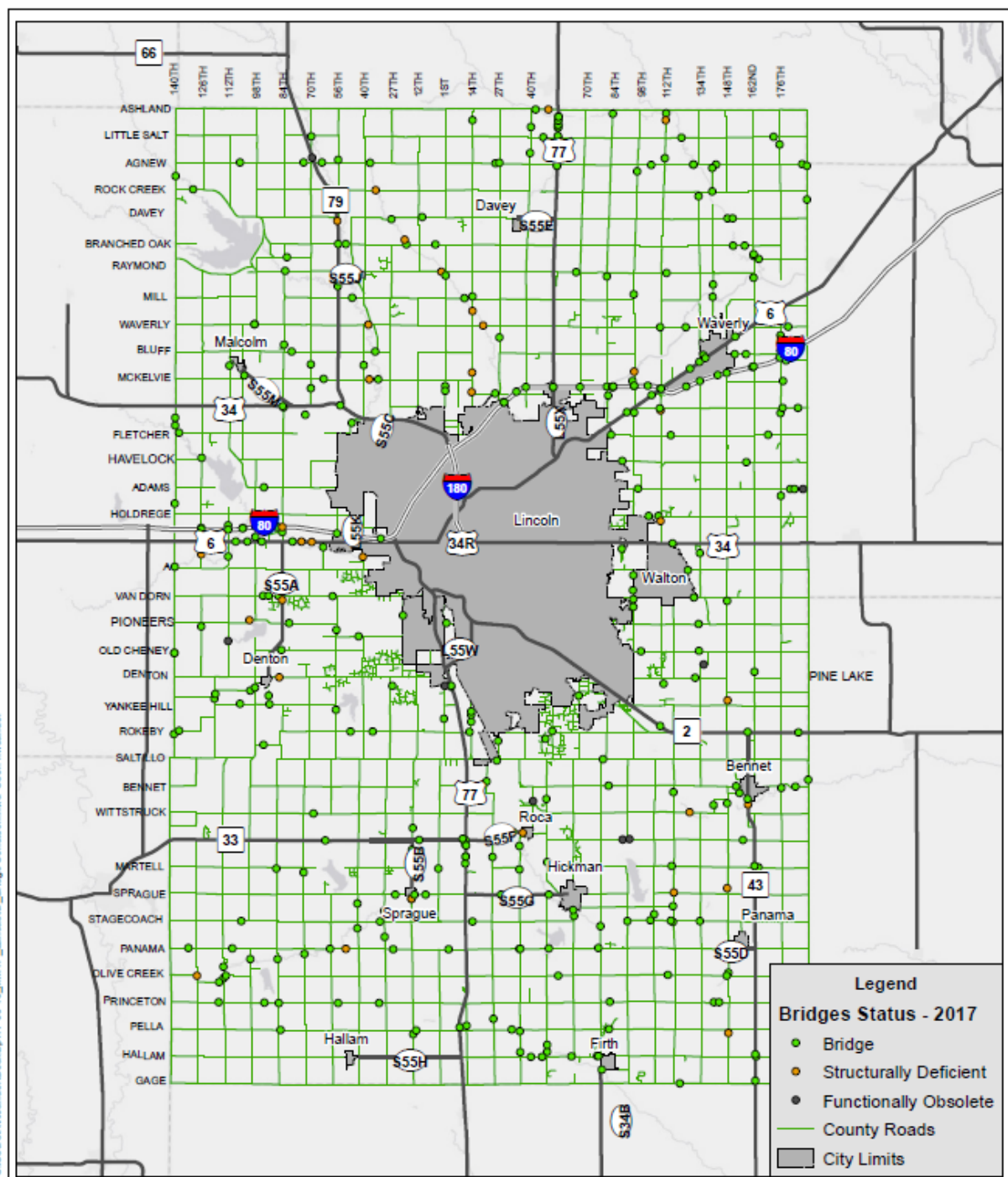


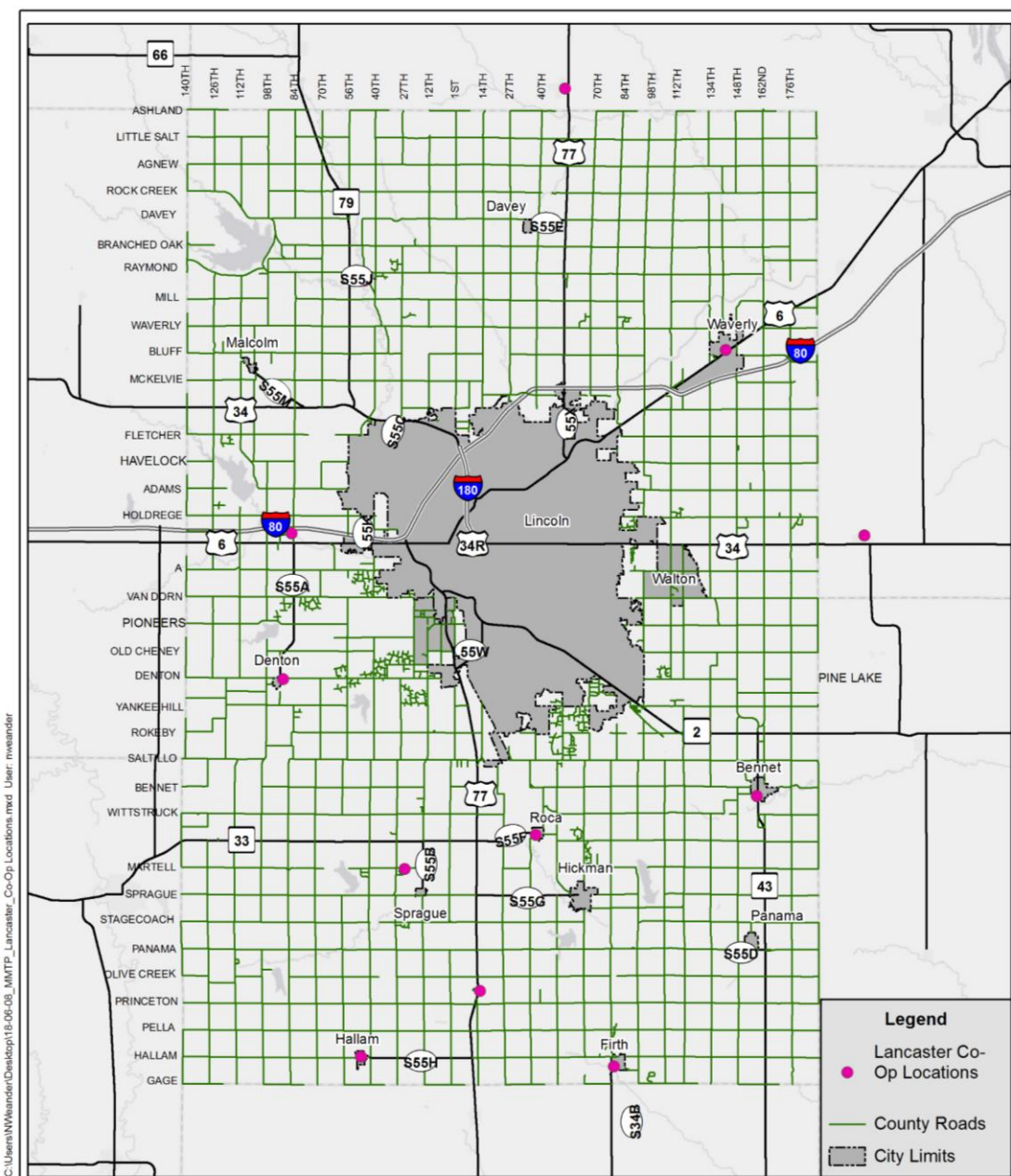
• *Based upon peer review range of practices, literature review, local policies, project experiences*

Bridges - Today

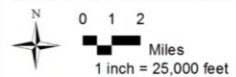
- Structurally Deficient – 27
- Scour Critical – 24
- Currently Closed - 9

C:\Users\NWeiler\Desktop\17-06-15_MMTP_Lancaster_Bridge Condition.mxd User: nweiler



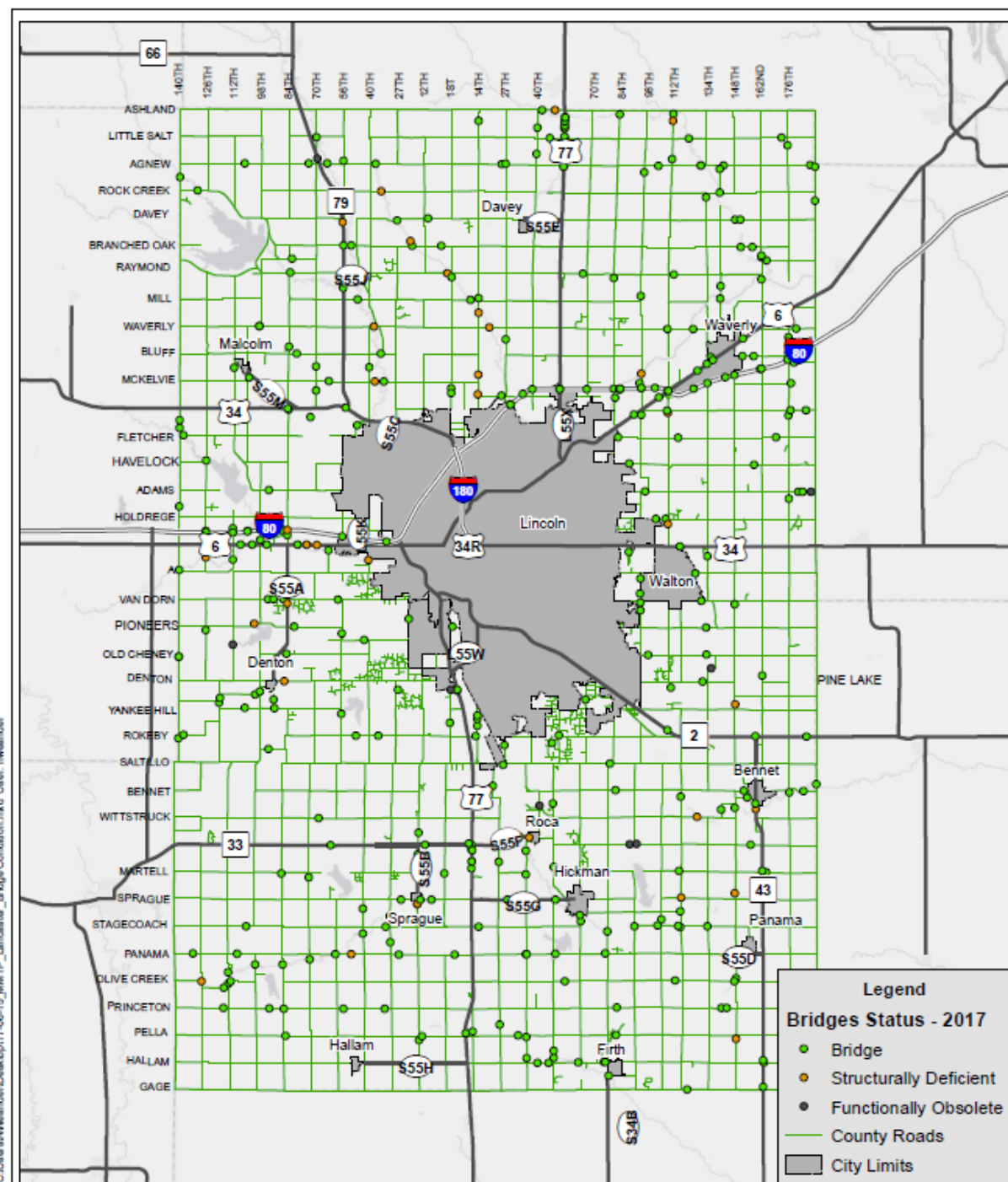


Data Source: Olsson Associates



OLSSON
ASSOCIATES

Transportation Implementation Strategy
Lancaster County, Nebraska
Olsson Project # 018-0583
Lancaster County Co-Op Locations Map

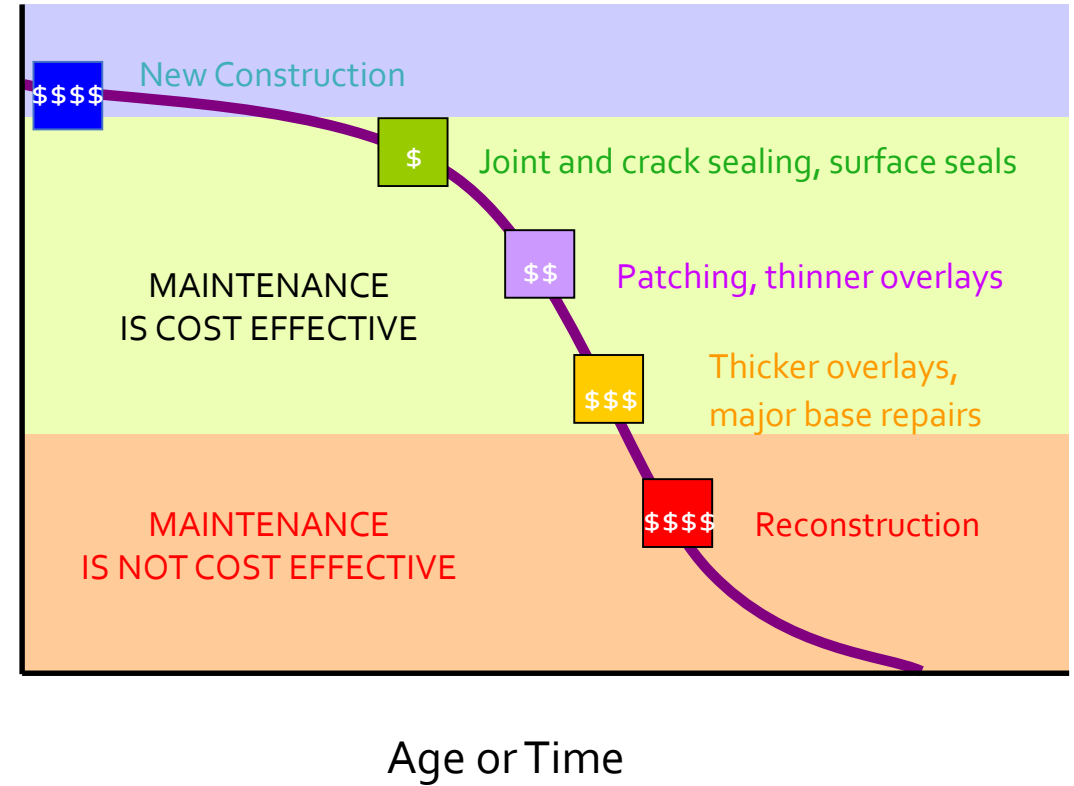


C:\Users\NWeander\Desktop\17-06-15_MMTP_Lancaster_Bridge Condition.mxd User: nweander

Best Practices - Pavement



Pavement Condition Index (PCI)



- *Based upon peer review range of practices, literature review, local policies, project experiences*

Best Practices - Bridge

- Bridge Management
 - Invest in Bridge Management Program
 - Apply Cost Effective Treatments at the Right Time –
 - Develop Estimates –
 - Inventory facilities
 - List most vulnerable facilities
 - Use deterioration models and cost models for life cycle costs
 - Identify long-term actions for bridge management system and costs



- *Based upon peer review range of practices, literature review, local policies, project experiences*

Best Practices - Overview

- Preservation Management Strategies for Road and Bridge -
 - Implement Long-term Asset Management Plan, linked to long-term sustainable financial plan
 - Decision-making tool
 - Includes: goals and strategies, performance targets, maintenance plans, financial plan, monitoring
 - Must have appropriate staffing to assist with asset management planning
- Develop multi-year asset management plan, which includes Capital Improvement Plan
- Utilize dust control on gravel roadways
- Standardize process for paving roadways
- Focus on paving existing roadbeds where possible



• *Based upon peer review range of practices, literature review, local policies, project experiences*

Homework!

- How would you prioritize:
 - Maintaining roadways
 - Grading, pavement maintenance, dust control, etc.
 - Paving roadways
 - Improving reliability
 - Bridge/culvert repair/replacement
- Do you concur with recommendations:
 - Preservation Management Strategies for Road and Bridge, including Asset Management Plan
 - Develop multi-year asset management plan, which includes Capital Improvement Plan
 - Utilize dust control on gravel roadways
 - Standardize process for paving roadways
- Other ideas?



Schedule - Lancaster County Infrastructure Task Force Executive Committee

- April 5, 2018: 2-3:30 pm - Kick-Off Meeting
- May 3, 2018: 2-3:30 pm - Meeting 2 - Waverly Engineering Shop, tour to follow.
 - Budget Analysis
 - Intro to Funding Options
- June 12, 2018: 2-3:30 pm - Meeting 3 – Norris Public Schools, tour to follow.
 - Best Management Practice Recommendation
- July 12, 2018: 2-3:30 pm – Gap Analysis and Funding Discussion– Denton Community Center, tour to follow.
 - Gap Analysis and Funding Discussion
- August TBD – Wrap-up

Next Steps

- Complete Budget Gap Analysis for Improvements with Options
- Evaluate County policies for new and infill development regarding transportation infrastructure
- Develop growth strategy based upon best practices



Discussion/Questions

Thank you!!

Jeff McKerrow, PE, PTOE
jmckerrow@olssonassociates.com

Nick Weander, PTP, MPA
nweander@olssonassociates.com

